

**COST ESTIMATION**

BME/BUTE – Faculty of Architecture  
Department of construction technology and  
management

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CM 2  
Building Project Management

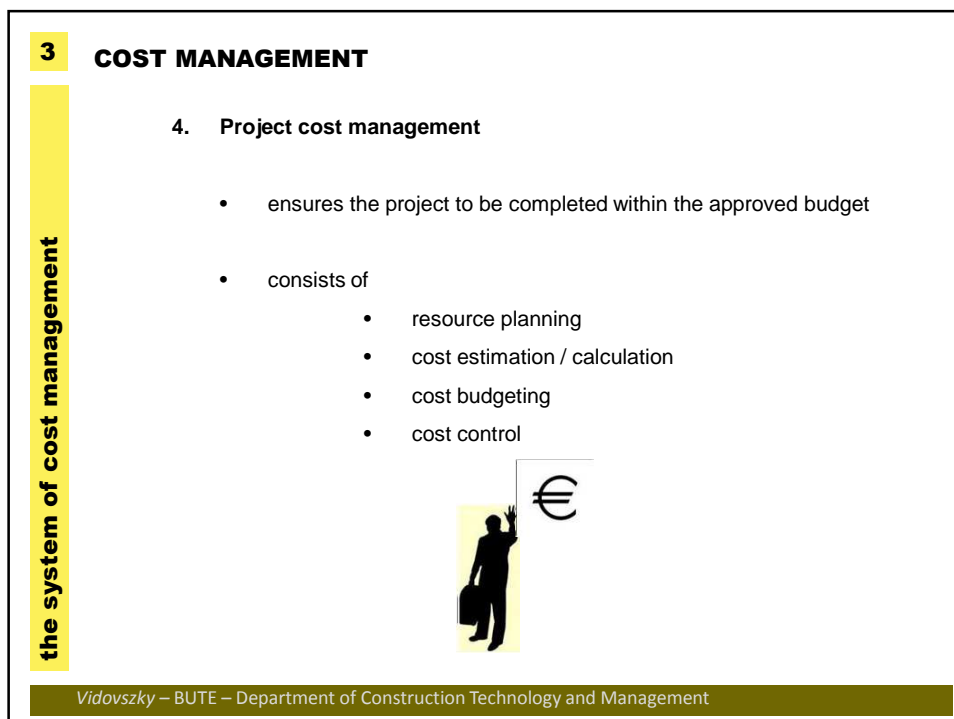
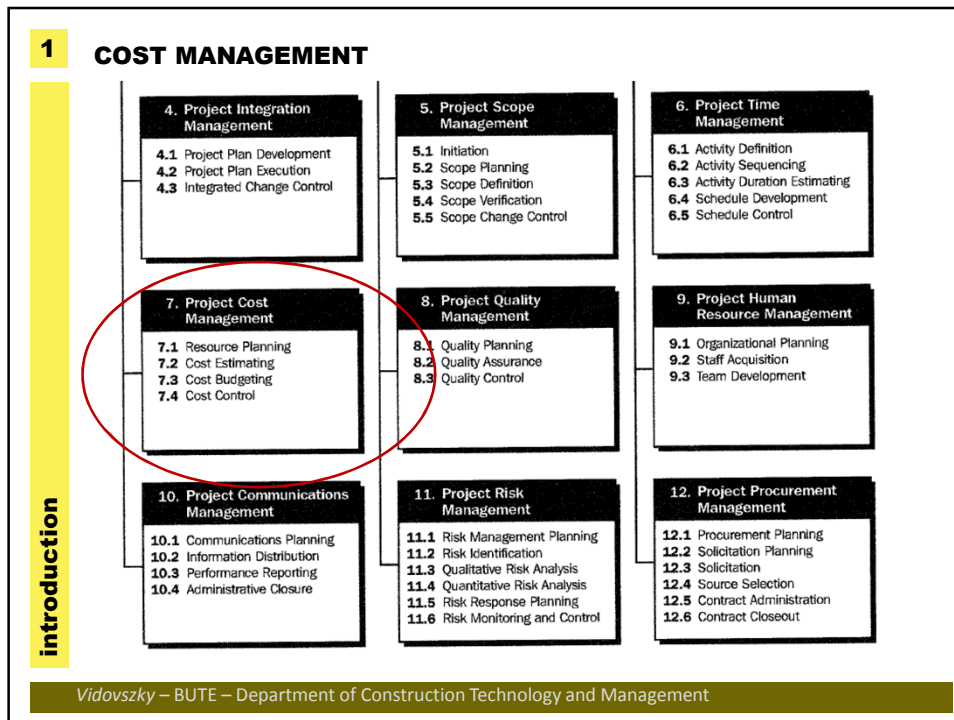
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**3 COSTS IN GENERAL**

**the system of cost management**

**time is money**

**credit**

**savings**

**rate of interest**

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**3 COST IN GENERAL**

**the system of cost management**

**Who has to deal with costs?**

**client / investor**

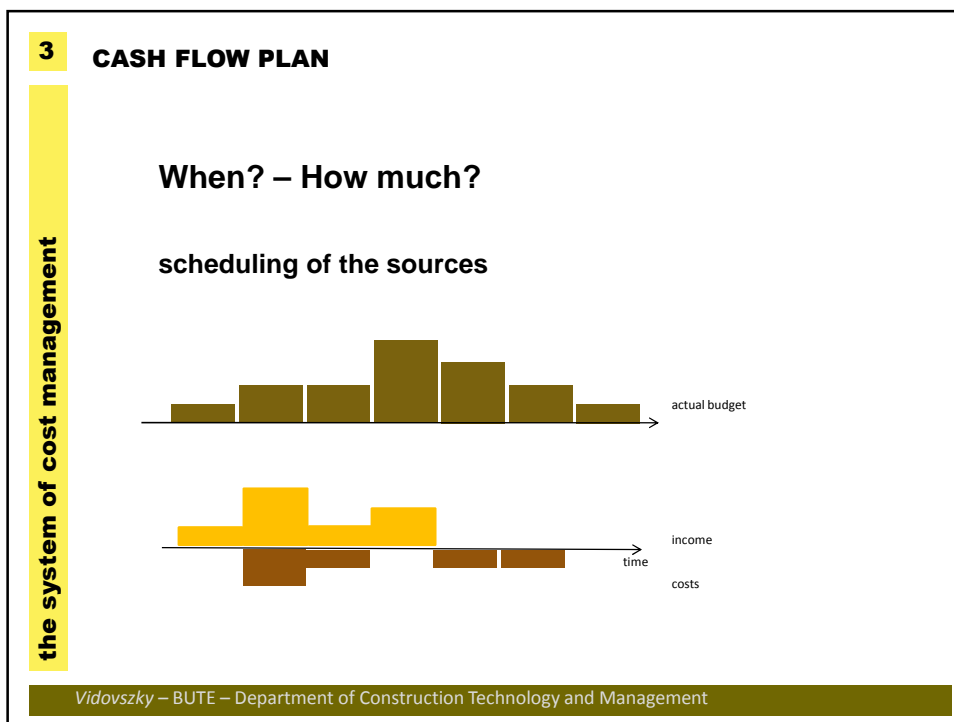
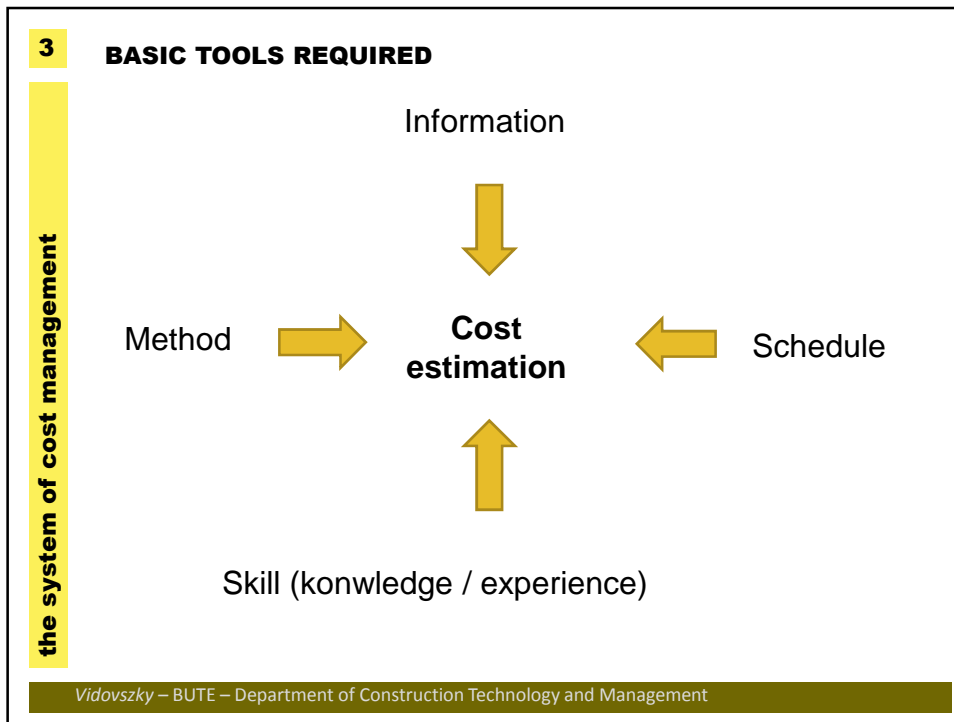
**contractor**

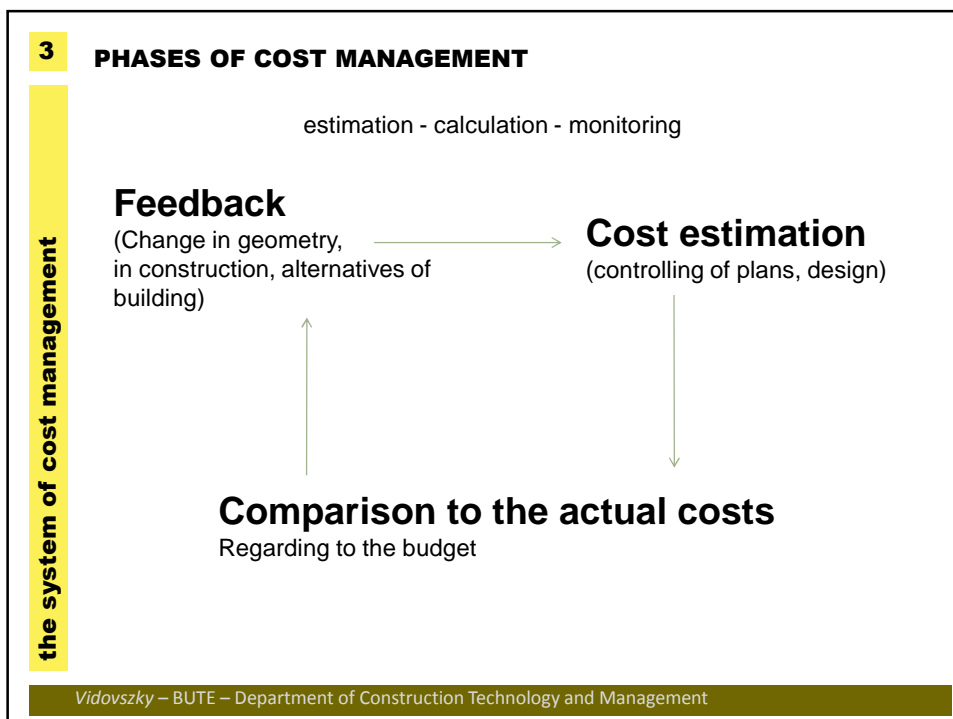
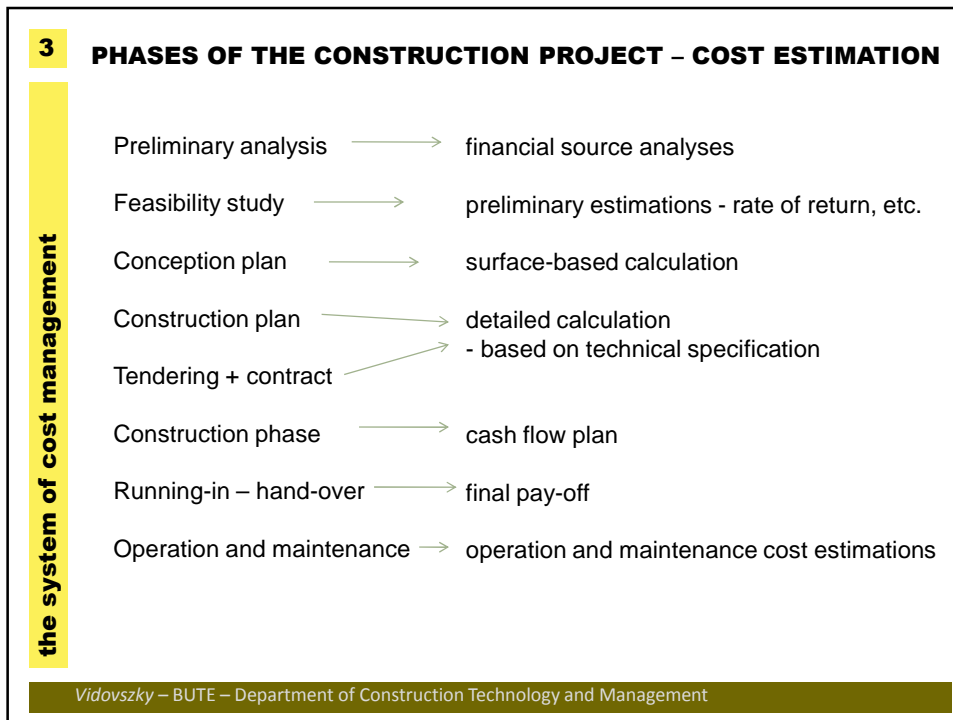
**PM**

**consultants**

**quality/quantity surveyor**

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### 3 PHASES OF COST MANAGEMENT

the system of cost management

#### Phase 1

Cost estimation

- intensive connection with the participants of the investment (information transport)
- determine the planned target
- design according to the aim of the project
- tendering for the construction

Cost estimation always must be synchronized with the design.

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### 4 PHASES OF COST MANAGEMENT

the system of cost management

#### Phase 2

Comparison the actual costs with the budget

- costs as they actually occur are continuously compared with the budget
- cost reports are prepared - at regular time intervals (information for the client on the cost status of the project)
- information in proper time is required - if effective action against cost overruns is to be taken

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#### 4 PHASES OF COST MANAGEMENT

the system of cost management

##### Phase 3 Feedback

- significant differences lead to change of the design
- management consideration is focused on those job areas that need attention
- preferring the alternative biddings at the competition is suggested

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#### 4 PHASES OF COST MANAGEMENT

the system of cost management

##### Criteria

- use cost estimating method, that fits to the project stages
- data should be transported from one project phase to the other
- systematic Work Breakdown Structure for the costs
- use of project cost code
- documentation of cost data of buildings accomplished
- use of Building Cost Documentation with data of analyzed method
- control of the costs: both direction between each of the project phases

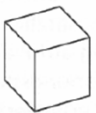
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**3 METHODS OF COST MANAGEMENT**

**the system of cost management**

**analithic**


cost and quantity components are based on the data of the **complete building**




220 €/m<sup>3</sup> BRI

**synthetic**

cost and quantity components are **based on detailed design**



1.320 €/m<sup>2</sup> BGF



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**3 PHASES OF COST MANAGEMENT**

**the system of cost management**

phases

↓

quantity of information

↓

→

→

→

analythic

synthetic

methods

- preliminary estimation (on the bases of samples)
- cost estimation based on surface model (€/m<sup>2</sup>)
- cost calculation based on technical specification (€/unit/work activity)

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**2 SIMPLE COST ESTIMATION**

cost estimation

cost values of similar construction cases

total cost / volume of an existing project (building) (m, m2, m3)



currency unit / construction unit

e.g. € / m2

**2 SIMPLE COST ESTIMATION**

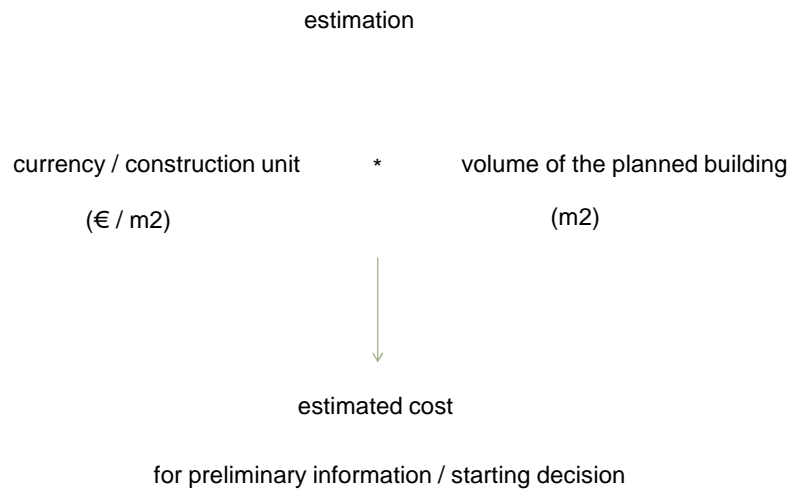
cost estimation

industrial databases e.g.:

building type function	construction cost data	
	average low	average high
residential - family houses	x.xxx € / m <sup>2</sup>	y.yyy € / m <sup>2</sup>
residential - low intensive	...	
residential - ...		
public - educational - nursery		
public - educational - school		
public - educational - ...		
public - cultural - museum		
public - ...		
office – category 1		
office ...		
industrial - category 1.		
...		

**2 SIMPLE COST ESTIMATION**

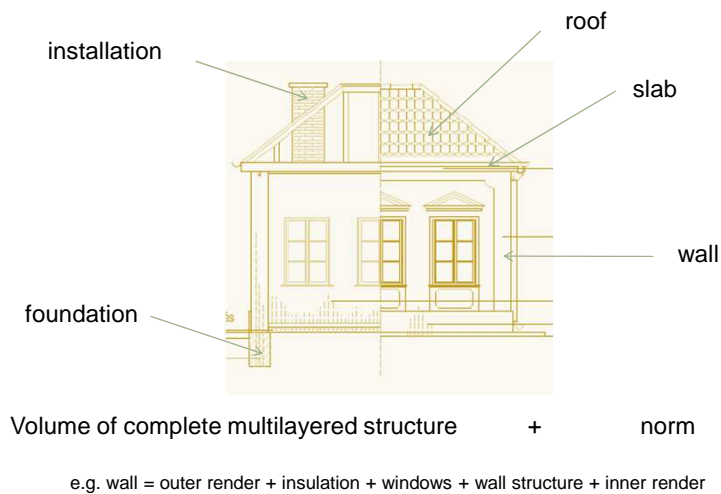
cost estimation



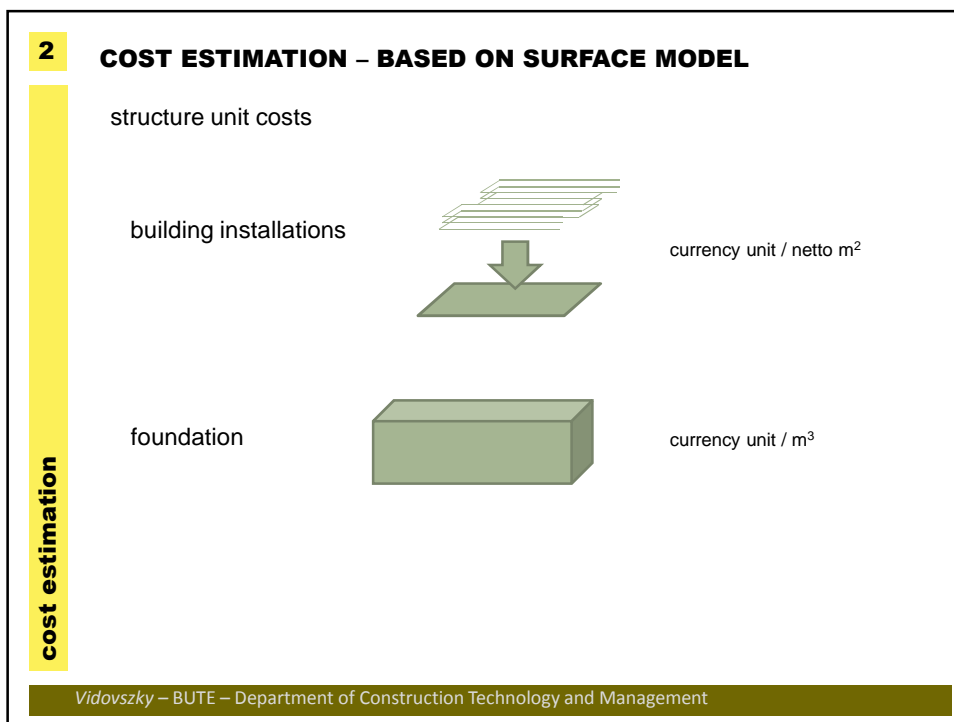
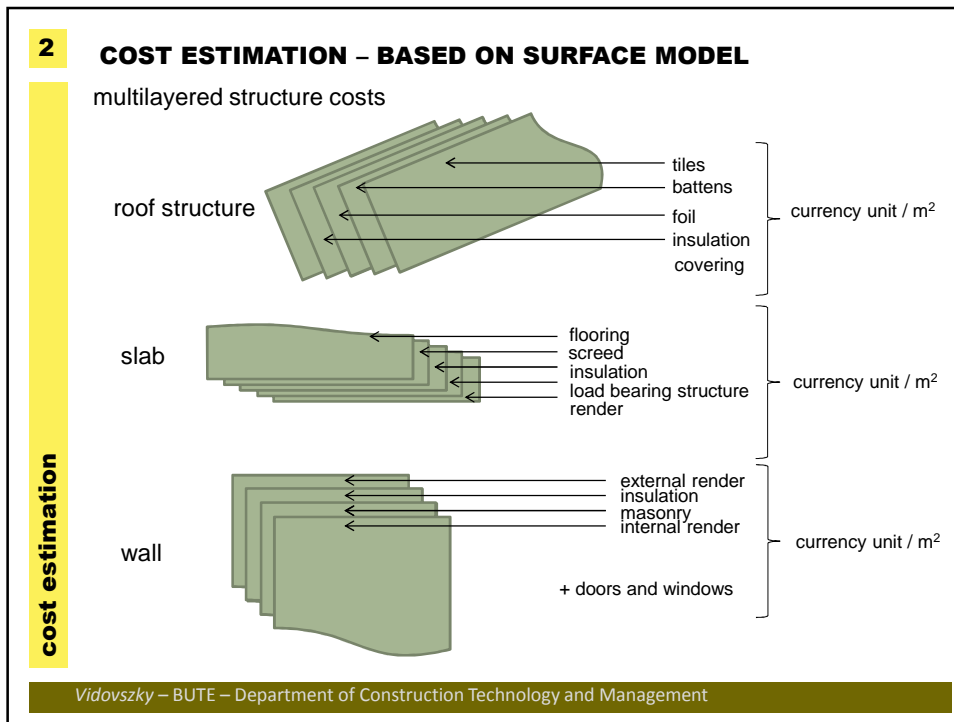
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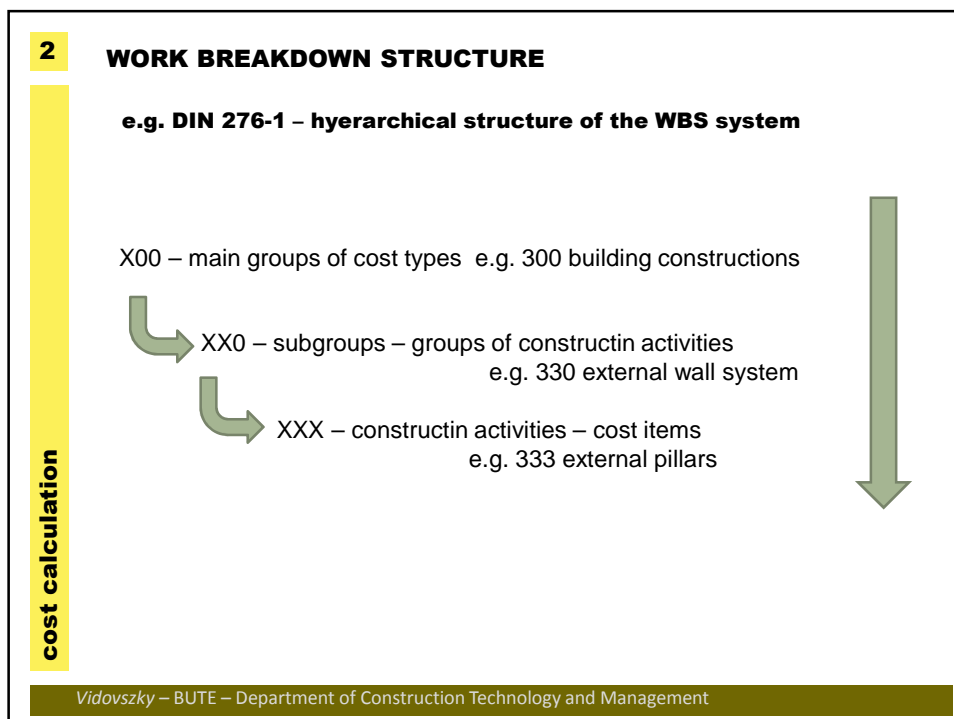
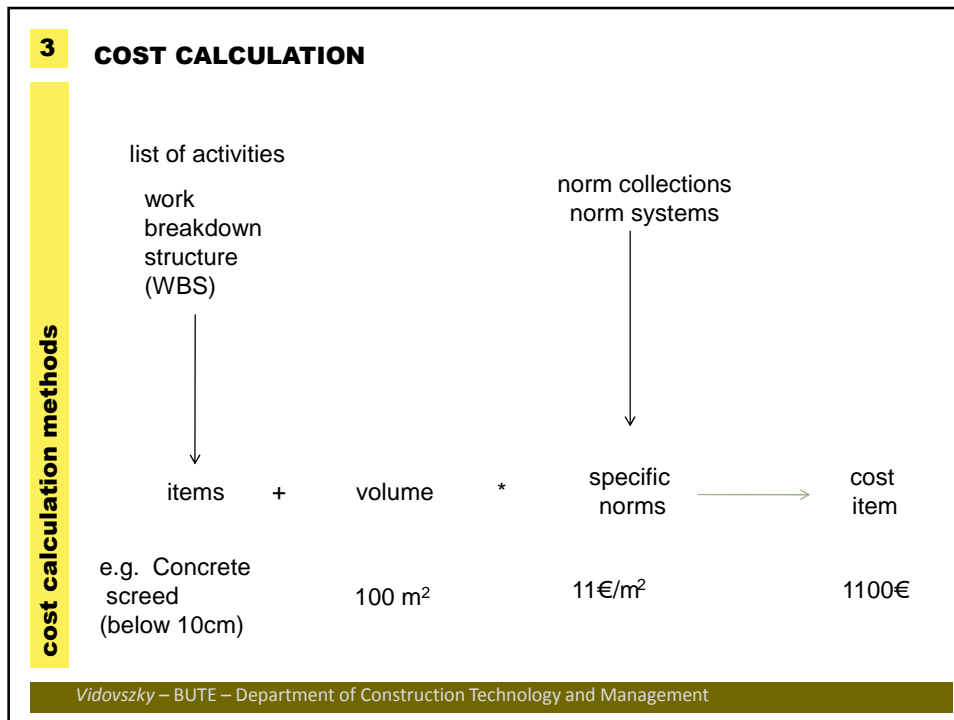
**2 COST ESTIMATION – BASED ON SURFACE MODEL**

cost estimation



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**2 WORK BREAKDOWN STRUCTURE**

cost calculation

**Main groups**

- 100 Building plot
- 200 Infrastructural facilities
- 300 Building – constructions
- 400 Building – installations
- 500 Outdoor constructions and installations
- 600 Furniture and artworks
- 700 Additional expenses

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**2 WBS – DIN 276-1**

cost calculation

**group 100**

- 100 Building plot
  - 110 Plot price (value)
  - 120 Incidental costs of ownership
    - 121 alignment
    - 122 cost of legal procedures
    - 123 notary costs
    - 124 estate agent pay
    - 125 duty
    - 126 valuation, and related expertise
    - 127 authorization fees
    - 128 plot alteration, withdrawal from cultivation
    - 129 other incidental expenses
  - 130 Liberation costs of the plot
    - 131 indemnification
    - 132 resolving form restrictions
    - 139 other

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**2 WBS – DIN 276-1**

**group 200**

**200 Preparation and infrastructure**

- 210 Preparation
- 220 Infrastructure - public utilities
- 230 Infrastructure - Internal
- 240 Renting public area
- 250 Temporary arrangements

**cost calculation**

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**2 WBS – DIN 276-1**

**group 300**

- 310 Pit for basement level
- 320 Foundation
- 330 External walls
  - 331 external load-bearing walls
  - 332 external walls, infill walls
  - 333 outer pillars
  - 334 external doors and windows
  - 335 facade
  - 336 interior finish for pillars, exterior walls
  - 337 external walls assembled
  - 338 shading
  - 339 other
- 340 Interior walls
- 350 Floors
- 360 Roof
- 370 Built-in appliances
- 390 Other arrangements related to building constructions

**cost calculation**

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**2 WBS – DIN 276-1**

**group 400**

**400 Building - building services and technical equipment**

- 410 Water, sewage, gas
- 420 Heating
- 430 Ventillation and air conditioning
- 440 Electricity
- 450 Telecommunications, information technology
- 460 Transportation equipment
- 470 Technology Equipment
- 480 Integrated building management and security management
- 490 Other arrangements related to building services and technical equipment

**cost calculation**

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**2 WORK BREAKDOWN STRUCTURE**

**DIN 276-1** **Base for budget: the total investment cost**

- 100 Building plot
- 200 Infrastructural facilities
- 300 Building – constructions
- 400 Building – installations
- 500 Outdoor constructions and installations
- 600 Furniture and artworks
- 700 Additional expenses

**cost calculation**

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## 2 COST NORMS

cost calculation

- based on statistics or company experiences
- can be found in databases or applied by calculation software
- usually involves more cost types in one norm e.g.:
  - material cost
  - transport cost
  - work fees
  - administrative costs of the construction company

In case of using a norm all these information have to be considered!

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## 2 COST NORMS

cost calculation



Hungarian Cost Estimation Manual  
for Construction Industry

annual publication

for architectural cost estimation

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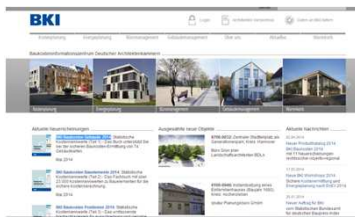


**2 COST NORMS**

Building Cost Information Centre  
of the  
German Chamber of Architects  
**BKI**

Online cost database in Germany

- BKI Construction costs for buildings 2014
- BKI Construction costs for construction elements 2014
- BKI Construction costs for positions 2014



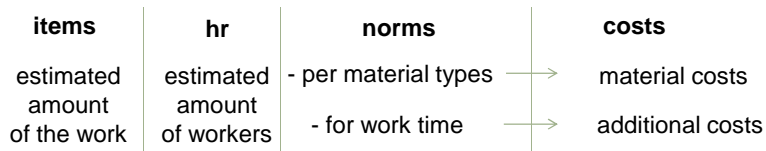
cost calculation

- based on statistical data of construction industry
- collected every year
- about different fields of the construction industry
- available for a certain fee

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**2 COST CALCULATION – „MOST ACCURATE” METHOD**

- before and during construction
- on the basis of detailed construction data:
  - construction plan
  - specification
  - firm database of the actual contractor
  - actual material prices



↑  
involves work fee + administrative cost + profit usw.

cost calculation

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**2 COST OVERRUNS**

**cost calculation**

technical – imperfect calculation method or data

psychological – overestimating the possible positive or underestimating the possible negative events

political-economic – result of strategic misinterpretation of scope or budgets

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**2 COST OVERRUNS**

**cost calculation**

quite common → risk analyses is required on the basis of

...resource analyses

...technical environment analyses

...legal / political environment analyses

**Avoid!!! BUDGET OVERRUN**

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**S****REFERENCES**

*Projektmenedzsment útmutató. PMBOK Guide.* Budapest, Akadémiai Kiadó, 2006, p.450

*Duncan, W. R.: A Guide to the Project Management Body of Knowledge (PMBOK Guide).* PMI, Sylva-NC , 1996.

Szőnyi László: Budget, Cost Estimation (presentation)

Szőnyi László: Budget, Cost Calculation Methods (presentation)

Szőnyi László : *Cost Planning of Building Investments.* Budapest University of Technology and Economics, Department of Construction Technology & Management (in Hungarian: Építőipari beruházások költségtervezése), 2011

Stewart R. D.: *Cost Estimating.* John Wiley & Sons, New York, 1982.

<http://www.baukosten.de> 2014-04-13

references